THE DELAWARE AND HUDSON RAILROAD BULLETIN

NOVEMBER DAYS
RICHMONDVILLE, N.Y.

NOVEMBER 1, 1934

The First Presidential Thanksgiving Proclamation

By the President of the United States of America
A Proclamation

WHEREAS: It is the duty of all Nations to acknowledge the Providence of Almighty God, to obey His Will, to be grateful for His Benefits, and humbly to implore His Protection and Favour; And where's both houses of Congress have, by their joint Committee, requested me "To recommend to the People of the United States, a day of Public Thanksgiving and Prayer, to be observed by acknowledging with grateful Hearts the many Signal Favours of Almighty God, especially by affording them an opportunity peaceably to establish a Form of Government for their Safety and Happiness."

Now, therefore, I do recommend and assign Thursday, the Twenty-Sixth Day of November next, to be devoted by the people of these States, to the service of that great and glorious Being, Who is the Beneficent Author of all the good that was, that is, that will be. That we may then all unite in rendering unto Him our sincere and humble thanks for His kind Care and Protection of the People of this Country previous to their becoming a Nation;—for the signal and manifold Mercies, and the favourable Interpositions of His Providence in the Course and Conclusion of the late war;—for the great Degree of Tranquility, Union, and Plenty, which we have since enjoyed;—for the peaceable and rational Manner in which we have been enabled to establish Constitutions of Government for our Safety and Happiness, and particularly the national one now recently instituted;—for the civil and religious Liberty with which we are blessed, and the means we have of acquiring and diffusing useful knowledge;—and in general, for all the great and various Favours which He hath been pleased to confer on us.

And also, that we may then unite in most humbly offering our prayers and supplications to the great Lord and Ruler of Nations, and beseech Him to pardon our National and other Transgressions;—to enable us all, whether in public or private Stations, to perform our several and relative Duties properly and punctually;—to render our national Government a Blessing to all the people, by constantly being a government of wise, just and Constitutional Laws, directly and faithfully obeyed;—to protect and guide all Sovereigns and nations, (especially such as have shown kindness unto us) and to bless them with good Government, Peace and Concord;—to promote the knowledge and Practice of true Religion and Virtue, and the increase of Science among them and us;—and generally to grant unto all mankind such a Degree of temporal Prosperity as He Alone knows to be best.

Given under my hand at the City of New York, the third day of October, in the year of our Lord, One Thousand Seven Hundred and Eighty-Nine.

G Washington

The
DELAWARE AND HUDSON RAILROAD
CORPORATION
BULLETIN

"Penn's" First R. R. Policeman

Retired Claim Agent Played Lone Hand for Many Years

MARTIN CRIPPEN

THE first, and for many years the only police officer on the Delaware and Hudson's Pennsylvania Division, its first personal injury claim agent, and the first president of The Delaware and Hudson Veterans' Association, Martin Crippen, terminated 43 years of active service with the company August 1, 1934. His ability to think and act quickly in an emergency, together with a profound knowledge of human nature, account for the success of Mr. Crippen both as a police officer and later as claim agent.

One day, about 30 years ago, Mr. Crippen was handed a warrant for the arrest of one George Joyce. Later he saw Joyce, together with three other men standing by the tracks. Approaching the group, he tapped his man on the shoulder and said, "Come along, Joyce, I have a warrant for you."

"No you don't, mister," said a surly voice and Mr. Crippen looked up into the muzzle of what he terms "the biggest gun I ever saw," in the hand of one of Joyce's companions. Joyce immediately produced a 22-calibre revolver so Mr. Crippen remarked casually, "All right, boys, you win."

Then, turning to Joyce, he added, "You ought to be ashamed of yourself, carrying a gun like that. Why you could shoot at a man all day at 30 yards and never hurt him. Let me see it." Joyce, off his guard, handed over the gun.

Holding it in the palm of his hand, Mr. Crippen continued, "Now that's a real gun your partner has," and calmly held out his hand. Without thinking the big man handed over his gun. Instantly—but too late—he saw his mistake; he was covered by his own pistol.

"Now come along, both of you," said Mr. Crippen.

On their way to jail the big man remarked, "There's just one thing I want to know: What made me give you that gun?"

"Simple," said Mr. Crippen, "I always hypnotize a man before I arrest him," and the big man apparently believed him. After serving a term for carrying a gun, this man went to work and to the best of Mr. Crippen's knowledge never ran afoul of the law again.

Born at Blakely, Pa., April 9, 1858, the son of a farmer and coal operator, Mr. Crippen worked for his father for several years after finishing a common school education. The Crippens owned a small, hand-operated breaker, where they prepared and sold anthracite which had been mined on their property nearby. Run of mine coal was placed on a large screen, with a four-inch mesh, and broken up with a sledge hammer. It was then graded in a huge manually-operated rotating screen, although only two sizes were marketed, stove coal, which was delivered for $2.25 a ton, and chestnut, selling for slightly less. Smaller sizes were disposed of as being of no value. In an average year they sold approximately 1,500 tons of coal.

In 1874, MR. CRIPPEN took a course in the Bloomsburg State Normal School, returning to his father's business after his graduation. Shortly thereafter he married Emma Dearie, descendant of one of the pioneer settlers of the valley. Following his father's death MR. CRIPPEN operated the coal business until 1881 when the workings neared exhaustion.

One day Police Captain McCann asked him to assist in the capture of a man wanted for attempted murder. The fugitive, later proved insane, had entered a church, vowing to shoot the priest, but, resting his rifle on the altar, had waited for his intended victim to finish a prayer. At this point he was seized and disarmed by some members of the congregation, although he was permitted to go free. MR. CRIPPEN'S work in apprehending this man led to his appointment as Chief of Police of Olyphant, an office which he held for three years.

Meanwhile he also became special officer for the Lackawanna Coal Company and a deputy sheriff. Occasionally he was given a special assignment by Delaware and Hudson Superintendent Roland Manville. On May 1, 1891, he became the first police officer on our Pennsylvania Division. By judiciously distributing railroad passes among peace officers of the valley, a practice not then prohibited by law, he was assured of all the assistance he would need in carrying on his work.

In 1904, MR. CRIPPEN resigned his police commission, although he continued to conduct investigations for L. E. Carr, Counsel, these duties engaging his time until August 1, 1907, when he became the first claim agent on the Pennsylvania Division. In the years that followed he represented the company in matters which took him far from his headquarters in Carbondale, yet so skillfully did he carry on his work that he gained the respect and good will of all with whom he came in contact.

"If you try to see the other fellow's point of view and look at the matter at hand through his eyes as well as your own, eventually you will find a bit of common ground on which to base a settlement which will be satisfactory to both the company and the claimant," said MR. CRIPPEN.

In addition to his duties as claim agent MR. CRIPPEN was one of the organizers and the first president of The Delaware and Hudson Veterans' Association, the membership growing from 78 to over 1,300 during his three terms of office. He is a past president of the Association of Officers of the Eastern Railroad Veterans, a Mason, and a life member of the Elks.

MR. CRIPPEN, who lives at 1715 Capouse Avenue, Scranton, has four daughters: Mrs. Charity Widdowfield, Mrs. Blanche Norton, Mrs. George Dickson Hays, and Mrs. Ralph B. Williams.

Pistol Shooters Win North Atlantic Championship

BY a seven-point margin over their traditional rivals of New York's "finest", the Delaware and Hudson police pistol team won the North Atlantic States championship at Hartford, Conn., October 7th.

Shooting the Camp Perry standard police course, the railroaders ran up a total of 1,388, against 1,381 for New York. The Pennsylvania State Highway Patrol placed third with 1,349, the Massachusetts State Police placing fourth with 1,345.

Out of a possible 300, OVERBAUGH, of the Delaware and Hudson made a score of 290. MASKO and HERRON shot 276, GRATCOFSKY 274, and RUSS 272.

His Companion

A MAN was moving with slouching feet,
Midday and the sun was riding high,
But he saw no beauty in earth or sky.
Beside him an unseen Spirit walked,
And often and softly to him talked:
"We've traveled together a long, long way,"
It said, "But I leave you, my friend, today.
I have followed you morning and noon and night;
I have whispered warnings to guide you right;
I have taken your hand and urged you on
To seize the chances that now are gone;
I have coaxed, and driven and pulled in vain
And thundered cautions again and again;
To what avail? Ah, behold you now—
The sunken eye and the lifeless brow.
I leave you, my friend, for there is no school
For the man determined to be a fool."
"And who are you?" sneered the man with a grin;
Said the Spirit, "The man that you might have
been."

—*Frank X. Piatt.*

Stone Burned

Leaving Layers of Anthracite Unharmed in Mine Ravaged By Fire Continuously since 1874

Petrified Tree

MINING engineers have for some time been attempting to find an explanation for the fact that, after a mine fire had been raging for 60 years near the Baltimore Colliery of The Hudson Coal Company, at Wilkes-Barre, Pa., successive layers of rock were burned, while intervening strata of anthracite were not greatly damaged. Some insist that rock does not burn but disintegrates; that only the carboniferous material in the rock is consumed. The fact remains that the stone is charred to a light red color, while 146,000 tons of unburned coal have been recovered from the burning area.

In January 1874, a "squeeze," occurring in the workings of the mine, in some manner ignited a vein of anthracite. According to one theory a furnace which was used to cause an air current to ventilate the workings before the advent of huge power-driven fans, was upset; another theory is that some engines and boilers were buried and that the underground conflagration is traceable to them.

At any rate, approximately ten acres of the richest anthracite veins in the world were originally affected. All passageways leading to the burning area were walled up to exclude the air and during the following 57 years the fire was confined to a space of 16½ acres.

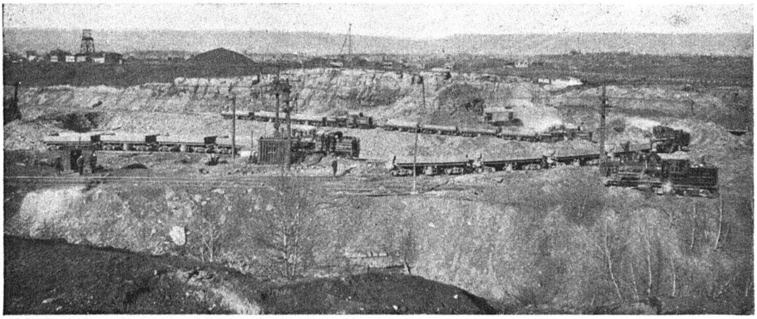
Recently inspections developed that the fire was spreading; also the amazing fact, already mentioned, that the combustion was limited to the rock while the veins of coal were apparently intact.

Up to this time a number of methods of extinguishing the fire had been tried without success. Clay seals were first placed in all openings leading to the area in an attempt to cut off the supply of air without which combustion would be impossible. When this system failed, rock walls were built in the openings, but even then sufficient air leaked through to keep the fire smouldering. Finally a thick blanket of sand and clay was spread over the entire surface area in an effort to smother the flames. Despite all these measures the fire raged on.

Meanwhile there was the constant danger that it might spread to other workings. More serious still, the carbon monoxide gas given off by the fire formed a hazard to miners working in other operations nearby.

As a last resort it was decided to cut the burning area out as a surgeon would remove a cancerous growth from the human body. Tests determined that the fire reached a maximum depth of approximately 90 feet and included a superficial area of about 16½ acres.

In 1931, therefore, a contract was let to the



Fighting a 60-year-old fire by Modern Strip-mining Methods

A. E. Dick Contracting Company, of Hazleton, Pa., calling for the removal of 1,682,600 cubic yards, or approximately 3-1/3 million tons of overburden (rock and dirt above and between the layers of coal) and approximately 236,600 tons of anthracite.

The first step in this project was the making of an "isolation cut," ranging in depth from 10 to 90 feet, but averaging 40 feet, to separate the burning zone from the unaffected veins. While this great ditch was being dug the engineers' report to the effect that the rock had been burned, while the coal had not, was proved correct. When the cut had been completed the black layers of coal could be seen in sharp contrast to the strata of charred rock above. As soon as the coal was exposed to the atmosphere, however, some of it did burst into flame and was lost.

When bed rock had been reached, assuring that the fire had been arrested along the west side of the region, operations were begun at the opposite side of the area to remove the rock and coal. Dynamite is being used to break up the rock prior to loading into the dump cars. Six-inch holes are drilled from 15 to 30 feet into the rock, into which 4 tons of dynamite are placed for each blast, the charge being detonated electrically.

Electric and deisel-powered shovels then load the rock into steel dump cars, each of which carries 12 cubic yards. The tracks, of 3-foot gauge, leading up from the pit, ascend over a maximum grade of four per cent. Three crews are kept at work constantly throughout the day removing the overburden and coal.

Up to June 1, 1934, 1,670,000 yards of rock and 146,000 tons of coal had been removed; however, the total overburden removed will probably exceed 2,000,000 cubic yards by the time the project is completed late this year.

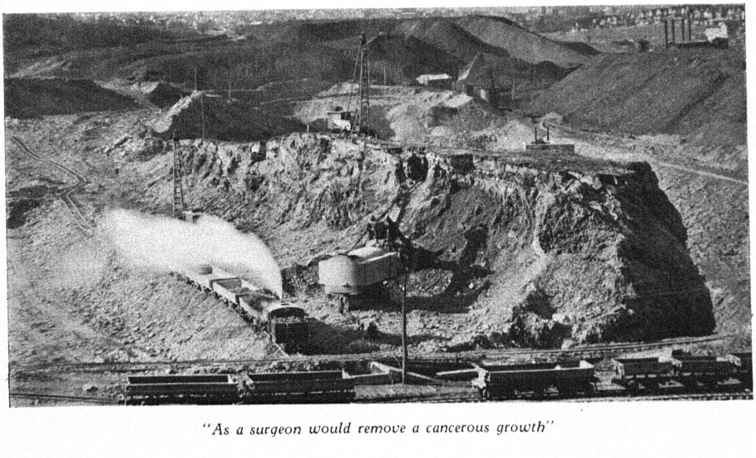
The coal recovered is hauled to the Baltimore Colliery for its initial preparation, after which it is taken in Delaware and Hudson standard railroad cars to Laflin for final processing before it is marketed.

An interesting phase of the work was the uncovering of hundreds of specimens of petrified trees, ferns, and various other flora throughout the area. Along one wall of the cut a dozen or more petrified trees are exposed, one of which is perhaps eighteen inches in diameter by eight feet tall. The others of which stand at approximately the same level, about 20 feet below the surface of the ground, are of nearly the same size, although considerably shorter.

At present the fire, which has been a source of danger for 60 years, while not entirely out, is under control, and soon the last spark will be extinguished.

While the primary purpose of this operation was the extinguishing of the fire, the mode of attack is in many respects similar to other "strip mining" operations in the anthracite field.

(Concluded on page 174)



"As a surgeon would remove a cancerous growth"

Inflation in France

(The Assignats)

MONETARY inflation is a progressive disease. Insidious and almost imperceptible in its inception, it gains impetus rapidly until it involves the whole economic structure in sweeping devastation.

Diocletian, a Roman administrator of real capacity, who reigned for twenty years from 284 A. D., attempted a currency reform but his efforts had no permanent results and he was soon caught in the meshes of "planned economy." He attempted, ineffectually as has so many times been tried, to fix by law the wages of all labor and the prices of all commodities; involved the Empire in a vast bureaucracy; decreed servitude for the masses by regimentation and prohibitions of migration, so laying actual foundation for the appalling poverty, ignorance, suffering, degradation and insecurity that afflicted Europe for quite a thousand years.

Can History Teach?

Historical repetitions should teach us their lesson. From the abdication of Diocletian, in 304, to the execution of Louis XVI of France, in 1793, the aspect of Europe changed vastly and power passed from the shores of the Mediterranean and the Bosphorus to those of the English channel and the North Sea and to the Iberian Peninsula. There had been a few centuries of genuine progress but, in 1789, when came the French Revolution, the treasury of France was bankrupt, masses of the population were in dire distress and governmental finance had been reduced to a series of fruitless expedients. The disasters of the Mississippi Bubble and John Law's inflation two generations before had not been forgotten, the wholesome fear of fiat money remained. A proposal was made to mortgage the confiscated lands taken from the Church, as security for a National currency of paper.

Never was argument for printing-press money more plausible, never has security seemed so sufficient, never has inflexibility of control been so ardently proclaimed or so generally accepted. The property confiscated represented the pious accumulations of 1,500 years; its value was five times greater than the whole issue of notes (called *assignats*), against which it was specifically pledged. The notes were made to bear interest at three per cent and it was urged, and believed, that this would prevent overissue, endowing them with an accumulative value that must bring hoarded metallic money again into circulation and effect their withdrawal from the monetary supply as they became redundant.

1790 and 1933

The first issue, 400,000,000 livres, was made in April, 1790. It produced the same effect that was seen here in 1933, when, by the Thomas amendment, inflationary powers were vested in the President of the United States; that is to say, the belief that money would become cheap created desire to exchange money for commodities and there was a temporary rise in prices and a temporary increase in business activities. But in less than five months, this impulse became exhausted and there was a new demand for cheap money.

On September 29, 1790, an additional issue in twice the volume of the first was authorized by a small majority of the National Assembly, and was accompanied by a solemn declaration that the total of 1,200,000,000 livres thus provided should never be exceeded. It was also promised that as fast as the notes were received in the Treasury, in exchange for lands which would be sold, they would be burned and that thus a continuous and beneficient contraction would be certain. Unlike the first issue, the new notes bore no interest.

How Inflation Grows

The debacle had begun. Inflation was now in full swing, feeding upon itself; pledges were worthless and certain to be repudiated. Metallic money, even copper and silver tokens, at once disappeared from circulation. Notes paid into the Treasury for land were not destroyed but were re-issued and, in November, barely two months after the pledge not to further increase, additional notes of 100,000,000 were authorized.

A fourth issue of 600,000,000 livres was provided on June 19, 1791, and another on December 17 of the same year, raising the total to 2,500,000,000, the fifth issue being accompanied by a new covenant of limitation. There were repeated new issues during the years from 1792 to 1795 and, on December 22, 1795, the purchasing power of the notes having fallen to almost nothing, it was grotesquely decreed that the whole amount ever to be issued should be limited to 40,000,000,000 livres and that when this aggregate had been reached the plates should be destroyed.

Yet, after this, there were additional issues of 10,000,000,000 livres, and, although accurate reckoning was lost, it is believed that the total approximated 45,000,000,000 livres. An end seemed to be made on February 18, 1796, when, in the presence of a vast crowd, all the machinery, plates and paper for printing *assignats* was publicly broken and burned at the Place Vendome.

But the Directory knew no remedy but to proceed from one inflation to another inflation. A forced loan to be exacted from the wealthier classes failed. A new sort of printing-press money, called *mandats*, to be secured by real estate belonging to the public, was provided for but, even before they could be issued, they fell to 35 per cent of their normal value and, within six months of their issue, they had fallen to 3 per cent.

Defeat seems to have been recognized by the decree of July 16, 1796, which, repealing all penalties against refusal to accept printing-press money at its face value, provided that all paper, whether *mandats* or *assignats*, might pass at its real value and that contracts could be made in any currency selected by the parties; a doctrine, it may be noted, adopted by the Supreme Court of the United States, in 1868, and still prevailing unless discarded by the 1933 repudiation. — *See Bronson V. Rodes, 7 Wall., 229.*

21 Billions—Poof!

Then, in February, 1797, the machinery for producing *mandats* was destroyed, as had shortly before been that for printing the *assignats* and, within three months, the 21,000,000,000 livres of *Assignats* still remaining in circulation were made valueless by law. It was then provided that two-thirds of the National debt should be paid in bonds, which the creditors were forced to accept, and that the remaining one-third should be entered upon a ledger and paid at the pleasure of the Government. These bonds speedily fell as the printing-press money had fallen and France was substantially without money and without credit until the accession of Napoleon, in 1799, as First Consul.

Effect on Business

The condition of France during this period was deplorable. Trade, commerce and manufacturing almost ceased. The late Andrew D. White, president of Cornell University, writing of this period said:

" * * * All this breaking down of the manufactures and commerce of the nation made fearful inroads on the greater fortunes; but upon the lesser, and upon the little properties of the masses of the nation who relied upon their labor, it pressed with intense severity. The capitalist could put his surplus paper money into the government lands and await results; but the men who needed their money from day to day suffered the worst of the misery. * * * There had come a complete uncertainty as to the future. Long before the close of 1791 no one knew whether a piece of paper money representing a hundred livres would a month later, have a purchasing power of 90 or 80 or 60 livres. The result was the capitalists feared to embark their means in business. Enterprise received a mortal blow. Demand for labor was still further diminished; and here came a new cause of calamity: for this uncertainty withered all far-reaching undertakings. The business of France dwindled into a mere living from hand to mouth. * * *

" * * * Nor was there any compensating advantage to the mercantile classes. The merchant was forced to add to his ordinary profit a sum sufficient to cover probable or possible fluctuations in value, and while prices of products thus went higher, the wages of labor, owing to the number of workmen who were thrown out of employment, went lower.

"But these evils, though great, were small compared to those far more deep-seated signs of disease

Then and Now on the H

Panoramic view of riverfront, City of Albany,
to about Madison Ave. as it

Albany riverfront, 1934, Delaware an

which now showed themselves throughout the country. One of these was the *obliteration of thrift* from the minds of the French people * * * the ordinary motives for saving and care diminished, and a loose luxury spread throughout the country. A still worse outgrowth was the increase of speculation and gambling * * * in the country at large there grew a dislike of steady labor and a contempt for moderate gains and simple living * * *"

The Death Penalty

Monetary confusion during the French Revolution developed inevitably into arbitrary price determination. The so-called "Law of the Maximum," advocated by Robespierre and St. Just, was adopted on September 29, 1793. It fixed the prices of articles of necessities at one-third above their prices in 1790, plus transportation at a fixed rate proportioned to distance, five per cent for wholesalers' profits and ten per cent for retailers' profits. Not even the guillotine could enforce these prices. Products of the farms and factories, so far as the latter were operated at all, were withheld from market; scarcity increased; supplies were rationed; dealers retired from business and, in spite of penalties, forfeitures and executions, the attempt at price regulation lasted scarcely more than a year. Before defeat was acknowledged, however, the Convention provided, in May, 1794, that the death penalty should be inflicted upon any person convicted of "having asked, before a bargain was concluded, in what money payment was to be made."

Bread, $9 a Loaf

Many authors have undertaken to trace the progress of prices during this period. In their equivalents in American dollars, at the period before the 1933 debasement of United States coinage, a pound of bread sold for $9.00; a bushel of potatoes for $40.00; a pound of candles for $40.00; a cartload of wood $250.00; a bushel of flour for $45.00; a pound of sugar for $12.50; a pound of soap for $8.00; a cabbage for $5.50; a pair of shoes for $40.00 and 25 eggs for $5.00.

Wisdom of Napoleon

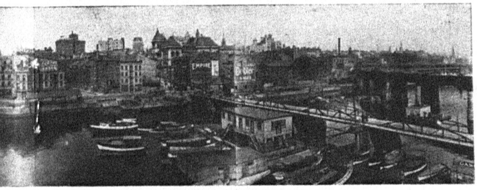
Many believe that it is as difficult to abandon as it is unwise to enter upon a policy of inflation. Napoleon had greater vision. At the time of his accession the evils here briefly and insufficiently epitomized were at their worst. The Treasury was empty, government debt was immense, collection of taxes seemed impossible, war was in progress on two frontiers and civil war in La Vendee. The army was unpaid and scarcely a day's expenses could be borrowed in any quarter. Yet Napoleon boldly declared "I will pay cash or pay nothing," and he paid cash.

Promptly, he arranged the assessments, funded the debt, made payments in cash and, from that day to Waterloo, France continued on a specie basis (with the exception of a few days suspension in 1807), and, during the whole period of almost continuous warfare, the nation suffered no severe financial distress. When the financial pressure was hardest and printing-press money was again proposed, Napoleon wrote to his Minister: "While I live, I will never resort to irredeemable paper."

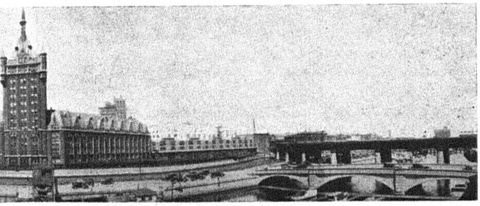
In truth, as John Sherman saw, and practiced, when the United States was confronted by greater difficulties than today: "the way to resume is to resume." Always and everywhere, the direct, courageous and honest route is the route to economic health and public welfare; forever, the route of timidity and dishonest repudiation is the route to confusion, destruction, and despair.

(NOTE: This concludes a series of five timely articles on subjects of vital importance to all.—EDITOR.)

the Hudson at Albany



f Albany, from N. Y. Central Railroad bridge
Ave. as it was prior to 1910



elaware and Hudson Building in center

The

Delaware and Hudson Railroad
CORPORATION
BULLETIN

Office of Publication:
DELAWARE AND HUDSON BUILDING,
ALBANY, N. Y.

PUBLISHED MONTHLY by The Delaware and Hudson Railroad Corporation, for the information of the men who operate the railroad, in the belief that mutual understanding of the problems we all have to meet will help us to solve them for our mutual welfare.

All communications should be addressed to the Supervisor of Publications, Delaware and Hudson Building, Albany, N. Y.

Vol. 14 **November 1, 1934** **No. 11**

I THANK thee, Lord, for strength of arm to
win my bread,
And that beyond my need is meat for friend unfed.
I thank thee much for bread to live;
I thank thee more for bread to give.

—ROBERT DAVIS.

Thanksgiving

WHAT have we to be thankful for as November 29th approaches? So much publicity has been given to the "hard times" that many of us have reached the state where we seem to have little left to be thankful for. If, when we think about the matter, we can find no one who is worse off than we are, ours is indeed a sorry lot. If, on the other hand, there is someone less fortunate with whom we can and do share what little we have, that in itself is cause for giving thanks. Surely no one who reads this will be unable to find another less fortunate with whom to share.

A Personal Matter

EARLY last month some four or five thousand men and women, representing practically every industry in the country, gathered in a great annual Safety Congress at Cleveland. Speakers, motion pictures and exhibits of all sorts were used in the consideration of the various problems arising in the attempt to prevent accidents. Is was a truly inspiring gathering.

A week later a much smaller but equally inspiring affair was held in Wilkes-Barre, Pa., when the men of the Delaware and Hudson Car Department force at Hudson and other points in the vicinity of Wilkes-Barre met with their wives, friends and a number of company officials to celebrate the completion of ten years without a reportable accident.

A speaker at the Safety Congress asserted that the human being is so constituted that he does not want to keep from being hurt. In the same way, a clergyman was quoted as having said, people do not want to be saved.

The meeting at Wilkes-Barre may be the exception that proves the truth of these statements. Certainly those men were most careful to avoid injury for a ten-year period, and are to be complimented on their performance.

Safety, when all is said and done, is a purely personal matter, at least on the railroad. Everything possible is done to insure that safeguards are provided wherever possible and that employees are instructed in the safe way to perform their work. It is up to us as individuals to care for our own safety and that of our fellows as well. As with Humpty-Dumpty, "all the king's horses and all the king's men" are powerless to repair damage which we, by taking a little extra trouble, can avoid. It's really a one-man job, for each and every one of us and for every member of our families. Most accidents occur in the home, and practically all are avoidable.

Five thousand people at a Safety Congress are powerless without our individual support. Let's give it to them beginning right now!

Suggested Reading

IT would be interesting to know how many Americans have read the Constitution of the United States, the document upon which the republic was built, since they passed out of school.

The chances are that far less than ten per cent could honestly say that they have read it. They have seen a few quotations from it in articles and editorials; they know vaguely that its purpose is to guarantee liberty and opportunity for all, and to assure stable, representative government, and that's about all they know.

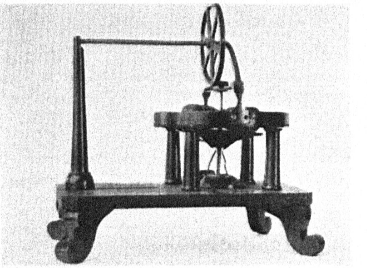
There never was a time when a general study of the Constitution would be so valuable as now. Today it is being criticized, it is accused of the crime of antiquity, and those who would change it say it has outlived its usefulness. The results of these attacks on the constitution are already reflected in legislation and in governmental procedure —liberties, rights, privileges, for which our ancestors fought and died, are endangered. In other countries, similar constitutional guarantees have

(Continued on page 174)

Do You Know That a Vermont Blacksmith

Invented the Electric Motor

Or What the Original Model Looked Like?



Patent office model of motor (1837)

THE invention and development of the waterwheel, the steam engine, the locomotive, the dynamo, and the electric motor have all been of the greatest industrial importance. Francis, Watt, Stephenson, and Siemens are usually connected with the first four, but few seem to know who invented the motor. Yet it was invented here in the United States, in New England, and was publicly exhibited in all the large cities of the East at various times over a period of several years.

The telegraph is commonly believed to have been the first device to make any practical use of electricity, and in fact it was, but the motor was invented before the telegraph. It was 100 years ago in July, 1834, that Thomas Davenport, a blacksmith of Brandon, Vt., first succeeded in producing rotary motion from the electro-magnet. This motor embodied all the essential principles and devices of modern direct current motors. It had a revolving armature, commutator, and brushes. This is not local tradition, but a matter of record. United States Patent No. 132 and Davenport's model, now exhibited in the Smithsonian Museum, are ample evidence of his achievement.

In addition to being the inventor of the motor, Davenport was the editor of the first electrical journal and a promotor of the first stock company for the purpose of manufacturing an electrical device.

We now know that Davenport's invention was premature. He needed cheap electricity, and the dynamo was not available until after 1860. If coal had cost $100 a ton in Watt's time, the steam engine would have remained a scientific toy until a cheaper fuel was discovered.

In 1830 no practical use for electricity was known. The only electromagnets in the world were about the size of electric bell magnets and were wound with a single layer of wire. In 1831 Professor Joseph Henry at Albany Academy was building the first powerful electromagnets ever constructed. One of these was acquired by a foundry at Crown Point, N. Y., and was used to detect and remove iron and steel from brass and copper scrap metal. This was probably the very first industrial use of electricity and the fame of this mysterious device spread over the countryside and even across Lake Champlain and up Otter Creek to Brandon, Vt., where Davenport heard of it and was possessed with an overwhelming desire to own it. Fortunately we have Davenport's own story of his first attempt, as published in the Plattsburg *Republican* of May 20, 1893.

"During this season (1833) I learned there was a powerful 'galvanic battery' at the Penfield and Hammond Foundry at Crown Point and was later informed that it was constructed by Professor Henry at Albany. It was stated that it would lift a common blacksmith's anvil. Crown Point being situated only about 25 miles from Brandon, I determined to journey there and gratify my curiosity and purchase, if possible, this wonderful battery as it was then called, but as the proprietors were not at home, I did not even have the pleasure of seeing it. I then hurried to Albany, but as Professor Henry was not in town, I had no means of knowing how or where to go for information respecting the apparatus I desired to purchase."

The story is continued by his brother, Oliver, who was a tin peddler and clock tinker, traveling through the country with the once familiar wagons decorated with brooms and tinware.

"I was peddling when Tom sent me word to come to Brandon and go with him over to Crown Point and buy the magnet. I returned to Brandon and Tom and I started for Crown Point with the peddler's cart. There we saw the magnet. It was shaped like a horseshoe, the arms 10 or 12 inches long and spreading six inches, wound with wire back and forth, perhaps an inch thick. The price of the little thing was $75. This was more money than we had and I tried to persuade Tom to leave it but he said 'No' he must have the magnet, and he proposed that I should sell goods from my peddler's cart and raise the money. So I went ahead and began to auction off the stuff. The goods sold pretty well and I remember how I got cheated in striking off a dustpan for three shillings, supposing it to be 50 cents, not knowing the difference between a York shilling and a Vermont shilling. It was soon evident that no $75 could be got out of the auction but Tom was not going back without his magnet. And so, while I was busy auctioneering, he swapped my horse for a poor beast and by putting the boot of the horse trade with all the other money we had in our pockets, we got the magnet."

Thomas Davenport later described the magnet as he first saw it as follows: "An electric magnet to which were attached by copper wires two sets of copper and zinc cylinders which were placed in weak acid in earthen quart mugs. When the poles of the magnet were placed on the face of a common anvil, the magnet adhered strong enough so that the anvil could be lifted by it."

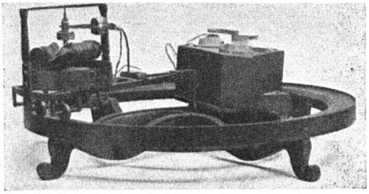
Brother Oliver's idea was to exhibit the magnet and get some return on their investment but Thomas insisted that he must take it apart and see how it was made. Oliver begged him not to run the risk of destroying it, but Tom was determined as he wanted to make another even stronger. That night (continuing Oliver's account) "he and Emily, his wife, set down and she with pen, ink, and paper and he with the magnet, and he began to unwind the wire. She had a fine education and was as enthusiastic as he was and wrote down exactly how the wire was wound on and all about it from beginning to end. The next thing he did was to go to his blacksmith's shop and make another horseshoe many times larger than the first. Then he and Emily wound it. First a coating of glue was put on the iron and then it had to be wound with silk. Emily tore up her silk wedding gown into strips and used that. The coils of (bare) wire had to be wound on without touching or else the whole thing would be spoiled. When finished with silk between each layer of wire, the magnet was a grand one and would lift a ton a minute."

Thomas Davenport wrote a history of his progress in invention that has never been published. The manuscript is now owned by the Vermont Historical Association. He soon saw the possibility of producing rotary motion and continued to experiment. At this point in his experiments he says: "My mind will not rest with so great a prospect before it of furnishing a valuable substitute for the murderous power of steam. * * * [Boiler explosions were very common in 1834.] I returned home and continued my experiments. In a few months the report was all over town that I was at work on perpetual motion. Between the two evils I thought it best to choose the least and explained my object which was to develop a new motive power which no doubt would eventually supersede steam. But this notion did not take. There were more that believed in perpetual motion than in my 'magnetic power' and my credit would have stood higher if I had allowed the report to go that I was after perpetual motion."

He had mounted an iron bar on an axis so that it was free to revolve across the poles of his electromagnet. Then by breaking the current just as the iron bar was over the poles, momentum would carry them a quarter turn or more when the current was again switched on and the process repeated. This was the first motor and just as the first steam engines were operated by moving the valves by hand, this first crude motor was operated by a manual operation of a switch. He soon devised a commutator and, at some point in his experiments, put the wire on the rotating armature and bent the former armature into two half circles which he then made of steel, hardened and then magnetized. He thus had an electromagnetic rotor and permanent magnet fields but he specifically states in his patent issued in 1837 that these permanent magnets may be replaced by "galvanic magnets" which was one of his names for electromagnets.

Continuing from his manuscript, he says: "I persevered in my experiments and in July, 1834, succeeded in moving a wheel about 11 inches in diameter at the rate of 30 revolutions a minute but I found that the cost of using it on a large scale would be enormous. But I reasoned that there would be as much improvement in the expense of galvanism (*i.e.*, batteries) as there had been in the expense of steam power. I considered that I had opened a wide field for philosophical research and accomplished all that I had expected or promised." The above-mentioned motor had "four electromagnets, two of which were stationary and two on the revolving wheel. The north poles of the revolving magnets attracted the south poles of the stationary ones with sufficient force to move the wheel until both poles of both the stationary and revolving magnets became parallel. At this point the conducting wires from the battery changed their position by the motion of the shaft and the polarity of the stationary magnets was reversed, thus producing a constant revolution of the wheel." His patent model however reverses the current in the rotor. Other models were shunt wound.

The first public exhibition of Davenport's motor was in the courthouse at Troy, N. Y. This was a new motor with "an improved commutator." The exhibition was entirely successful and Davenport, after showing his model to Professor Henry and others, went to Washington to secure a patent, only to find that the cost of a model, specifications, and fees exceeded his ability to pay, and he was forced to return to Brandon. There, needing money for current expenses, he sold his motor to the Patroon, General Van Rensselaer of Albany, for $30, probably the first sale of an electric motor. This motor was preserved in the Rensselaer Polytechnic Institute at Troy but unfortunately was destroyed in the fire of 1862.



Davenport's model electric railway

Following this forced sale, only the faith and loyalty of his wife and the sacrifices of his brother gave Davenport courage to continue. He secured money to build another motor which was successfully exhibited at Troy, where it excited the interest and financial support of a Mr. Kimball of Springfield, Mass. With the $50 so obtained, Davenport now built a model electric railway, running on a circular track, which was exhibited in Boston and Syracuse. Through these exhibitions he finally secured sufficient capital to enable him to secure his patent, which was issued on February 25, 1837.

Following the issuance of his patent Davenport's troubles were the same as those of many other inventors. A joint stock company was promoted and shares to the value of nearly $10,000 were sold, but of this amount Davenport and his brother received less than $600. About this time (1840) Davenport seems to have lived in New York iCty, where he built a motor large enough to drive a small printing press on which he printed the *Electro-Magnet and Mechanics Intelligencer*, a small sheet 12" x 14", in no way remarkable in itself but distinctive as being the first electrical paper in the world and in addition the first printing of any kind struck from a press driven by electricity. This was not a financial success but after a short interruption, Davenport tried again under the title *The Magnet*. This was even more short lived than the first, but altogether he attracted the interest of investors to the extent of about $3,000, to be used for large-scale experiments.

His press notices would be considered highly satisfactory today. The *Saratoga Sentinel's* headline read: "Highly Important Invention of the Electro-Magnetic Engine"; the New York *Herald's*: "A Revolution in Philosophy—Dawn of a new Civilization"; the New York *Herald* said that the motor would raise a 200-pound weight at the rate of a foot a minute, and further "if we can turn one spindle for spinning cotton, 1,000 or 5,000 can be turned." And there were other notices in many other newspapers and also in Silliman's journal, the leading scientific magazine of the country. What Davenport needed was the dynamo. In Europe, Pixii had built a direct current magneto generator in 1832 and by 1835 Saxton and Clarke had greatly improved it. The first steam driven (magneto) dynamo came about 1865 but if Davenport's motor had received enough publicity, who can tell how much these events might have been hastened? The industrial world has always been eager for any new sources of power. None of these things, however, happened, as the bank in which Davenport had deposited his money failed and with this last blow to his hopes, he returned to his blacksmith shop and seems to have made no further attempts to sell electric motors.

Jacobi, a Bavarian, the inventor of electro-plating, also invented an electric motor. As so often happens in the history of invention, two men in different parts of the world were experimenting along the same lines at the same time. Davenport's first success was in July, 1834. In November, 1834, Jacobi wrote that he first obtained rotary motion in May of the same year. If the rotary motion which Jacobi obtained in May was produced by the same apparatus that he described in November, his technical priority must be conceded, but it does not appear to be certain that such is the case. In any event it is remarkable that one who labored under such limitations and disadvantages as Davenport, should by the unaided force of his native genius, have achieved such a result.

—L. L. Thwing in *Technology Review.*

Stone Burned

(*Continued from page 166*)

Most anthracite is situated so deep in the ground that a mine shaft is sunk vertically or at a sharp angle, with tunnels branching off to the strata of coal. The Hudson Coal Company's deepest shaft, commonly known as Conyngham Shaft, Baltimore Colliery, reaches a depth of 1,100 feet, although some of the workings leading from it descend an additional 300 feet. The deepest anthracite mine in Eastern Pennsylvania extends to a depth of 2,200 feet.

A small percentage of the veins are located so near the surface that the coal can be exposed by stripping off the layers of rock and dirt above it with power shovels, the anthracite being then removed by the same means. Ninety to 100 feet is the maximum depth of such workings on The Hudson Coal Company's property. Mining engineers have found that where the ratio of overburden to coal is under 10 to 1, stripping operations can be considered economically feasible.

The Hudson Coal Company does no strip mining itself; in each case contractors are asked to bid on the work, the contract calling for the removal of coal and overburden at a specified amount per yard of each. If the bids are low enough the contract is let; if not, the work is deferred or abandoned as being too costly.

Some contractors use huge electric shovels, steam locomotives and cars in their work; others employ small steam, gas or oil powered shovels and automobile dump trucks. Satisfactory results have been obtained with both systems. Steam shovels were quite extensively used in this work. Oil and gas shovels are now coming into use and where electric power is available electric shovels are becoming popular.

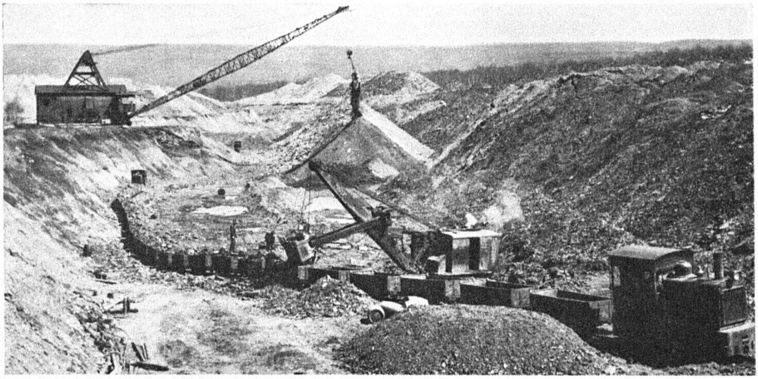
At Forest City a stripping operation is in progress at which one of the largest power shovels in the east is being used. The two "walking shoes" on this gigantic machine cover a total area of 420 square feet; it weighs 375 tons; its boom is 160 feet long; it is powered by a 300-horsepower diesel engine; and its bucket has a rated capacity of six cubic yards.

Suggested Reading

(*Continued from page 170*)

been thrown overboard—and the final result has been invariably dictatorship. It should be everlastingly kept in mind that the Constitution is the bulwark that stands between us and one "ism" or another.

Read the Constitution, paying special attention to the sections which compose the Bill of Rights. Those sections reflect all that man has striven for through thousands of years of turmoil—the widest possible liberty, the right to live as an individual, dominated by none. If the Constitution is out-of-date, so is the cause of human freedom.—*Sidney Record.*



Strip-mining with 300 H. P. Diesel Shovel

Clicks from the Rails

An Old German Doctor

was consulted by a Milwaukee couple back in 1848 about the health of their puny 11-year-old boy. After his examination the doctor shook his head gravely and announced that the lad was suffering from several ailments, the most serious of which was a palpitating heart. He prescribed cognac and tobacco. The boy graw up, went to work in the Milwaukee shops of the C. M. St. P. & P., and is still working at the age of 97 years. At a recent convention of veteran railroaders this old-timer, who has a full head of hair, not yet white, said he would have to keep an eye on his boy, a youngster of 61, who was attending his first convention.

◆

A Cedar Tie,

which under normal operating conditions might have been expected to give 15 years' service, is in a main track at Hermansville, Mich., after 46 years. When an industrial track was abandoned recently this tie, laid in 1888, was found to be in such good condition that it was placed in the main track. As no tie plate was used when it was originally installed, a half inch of wear occurred under the base of the rail. Now, laid with tie plates, under 80-pound steel, it is expected to remain in the track for at least 15 years more.

◆

A Tough Job,

if ever there was one, is that of superintendent on the Chinese Eastern Railway, one division head reporting that between June 17 and August 6 the following events occurred: 12 train wrecks, 43 bandit raids, 2 murders, 24 railway employees wounded, 14 robberies, 28 cases of damage to roadbed and rolling stock, 2 fires, and 9 cases of sabotage to telegraph and telephone lines. American division superintendents who think their jobs are difficult should think of the Chinese Eastern.

A Visit of a Queen

while it might sometimes be considered an honor, proved quite an inconvenience to a towerman on the Norfolk and Western and nearly tied up the railroad until the departure of the royal visitor and her retinue, especially the latter. Operator Calloway's first inkling of the intruders, for such they were, came when he heard the murmur of their conversation, or the buzzing of their wings and beheld an entire swarm of bees which had entered through an unused cable conduit in search of their missing soverign. Fortunately an employee who had been raised on a farm was within call and in a short time, with his bare hands, he had rid the tower of the delegation and railroad operation returned to normal.

◆

The First Iron Bridge

for a railroad, having four 12½-foot spans, was built in 1825 by George Stephenson to carry the Stockton & Darlington Railroad (England) across the River Gaunless. At present a new "world's longest railroad bridge" is in process of construction across the Zambesi River, in Central Africa. This structure, when completed, will have 39 spans and a total length of 11,651 feet. Appropriately enough the new bridge is being built at Darlington, England, in the heart of the Stephenson country, and it will be shipped to Africa in sections as the work progresses.

◆

The Smallest Railroader

in the world is probably Bud Evans, colored special porter on the Gulf, Mobile & Northern, who at the age of 52 stands 27 inches tall with his shoes on and weighs just under 60 pounds after eating a hearty chicken dinner. Although flattering offers to join circuses have frequently come to Bud, he turns them all down with the expression, "Once a railroader, always a railroader."

A Fast Freight Train,

recently placed in service by the Milwaukee, is scheduled to cover the 410 miles between Chicago and St. Paul in 11 hours, with intermediate stops at LaCrosse and Winona. From start to stop the train averages better than 37 miles per hour so that when proper allowances have been made for stopping, the actual speed is considerably higher. Shipments delivered at the freight house in Chicago late in the afternoon are delivered in St. Paul early the next morning. The balance of the train reaches Minneapolis one hour later.

◆

A 4-ton Mammoth's Remains

were unearthed during the widening of the Great Western Railway (England) at Cogload Junction. An upper molar tooth weighing several pounds, parts of other teeth, and the tusks were presented to the Somerset County Museum at Taunton. Naturalists say that this mammoth, a prehistoric inhabitant of England, probably stood nine feet high at the shoulder.

◆

Several White Storks

or at least birds which closely resembled that species, took up summer residences at a big pond at the Frisco's Springfield, Mo., shops. The employees, who tentatively identified the birds as storks, believed that they had migrated from some drought area. Since recent rains, most of them have taken wing.

◆

Free Card Games

are being presented to children traveling on the Neitherlands Railway Company (Holland) in an effort to keep the youngsters amused while aboard the trains. Each deck is made up of colored photographs of locomotives, other rolling stock, signals, etc., and each contains instructions for playing a simple game.

An Epitaph

IN a quaint old cemetery in the East is a marker erected to the memory of a man whose life is reckoned successful. Upon the marker has been carved an epitaph that should be a tonic to our day. It reads thus:

I tried and failed,
I tried again and failed,
I tried again and failed,
I tried again and failed,
I tried again and failed,
I tried again and failed,
I tried again and won.